Do different types of natural resources have different effects on internal conflicts?

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Contents

Summary

I re-estimate a baseline conflict model presented by Ross (2012). I use a logit model, and perform the regressions in STATA. Whereas Ross (2012) examines the relationship between oil income per capita and civil war, I examine the relationship between fuel exports (% of GDP) and civil war, and mineral exports (% of GDP) and civil war, respectively. I test whether different types of natural resources give different types of internal conflicts. The two types of conflicts that I consider are (i) separatist conflict and (ii) government conflict. I find that neither fuel exports (% of GDP) nor mineral exports (% of GDP) are significantly linked to the onset of civil war. Mineral exports (% of GDP) is only significantly linked to separatist conflict, whereas fuel exports (% of GDP) is not linked to either two conflict types. I also introduce binary measures of mineral exports (% of GDP), fuel exports (% of GDP), and oil income per capita. The binary measure of fuel exports (% of GDP) is not linked to the onset of civil war, government conflict, or separatist conflict. The binary measure of oil income is significantly linked to government conflict, and the binary measure of mineral exports (% of GDP) is significantly linked to government conflict. The binary measure of mineral exports (% of GDP) is in addition significantly linked to the onset of civil war for all states and periods.

In addition I briefly examine whether democracy plays a role in the link between natural resources and internal conflicts. I exclude countries that are democratic to examine if the results change. I try different threshold levels for excluding democratic countries. I find that fuel exports (% of GDP) and mineral exports (% of GDP) are not significantly linked to the onset of civil war when I exclude democratic countries. Mineral exports (% of GDP) loses significance for separatist conflict when democratic countries are excluded. Fuel exports (% of GDP) becomes significant for separatist conflict, and partially for government conflict when I exclude democratic countries at different threshold levels.

Ross (2012) log-transforms his oil variable before performing the regressions. The natural log is only defined for positive values. In order to include countries with zero oil production, Ross (2012) adds the value 1 to this measure for all countries. As a robustness check of Ross's

(2012) results, I check what happens if I change the origin of the underlying variable before log-transforming it. Whereas Ross (2012) finds that oil income per capita is significantly linked to both government conflict and separatist conflict, the new log-transformed oil income variable is not significantly linked to government conflict and separatist conflict.

Ross (2012, p.185) divides the data sample into two period, the Cold War era (1961-1989) and the post-Cold War era (1990-2006). He finds that oil income is only significantly linked to the onset of civil war in the post-Cold War era. This is not in line with what other scholars find (Fearon & Laitin, 2003, and Collier & Hoeffler, 2004). Ross's (2012, p.179) hypothesis is that oil producing countries have a higher rate of conflicts after 1980, ten years before the Cold War ended, than before 1980. I examine whether there is a difference between civil war onsets in the Cold War era, and in the post-Cold War era also when using my two resource export reliance measures. I find that both fuel exports (% of GDP) and mineral exports (% of GDP) are not significantly linked to civil war onset in either two periods when dividing the data sample in two. The binary measure of mineral exports (% of GDP) is however significantly linked to the onset of civil war in the Cold War era.

1 Introduction

Many scholars find that natural resource wealth can be harmful to a country. As Auty (1993, p.1) writes "not only may resource-rich countries fail to benefit from a favourable endowment, they may actually perform worse than less well-endowed countries". This is the so-called resource curse, also called the paradox of plenty (Karl, 1997). One of the detrimental consequences of resource wealth suggested in the literature is violent conflict. Violent conflict harms a country and its people. Conflict can be harmful to economic growth by, for example, preventing or reducing the access to welfare goods, such as education and health care (Bannon & Collier, 2003). Reduced economic growth may, over time, throw more people into poverty. This, in turn, motivates research on what affects the likelihood for the onset of conflict, which is the topic of this thesis.

Ross (2012, p.3) studies the economic and political consequences of oil income. In this thesis, I replicate his analysis of the interplay between internal conflict and natural resources.[1] Ross (2012, p.3) writes that whether or not other minerals have the same effect as oil on the development of nations, is an important question, but one that goes beyond the scope of his book. Inspired by this point made by Ross (2012), I re-estimate his baseline model using a broad measure of minerals exports as a percentage of GDP. In addition, I test the effect of another composite measure, fuel exports as a percentage of GDP.

Besides distinguishing between two composite types of natural resources, I distinguish between two types of internal conflicts. The two types of conflicts I consider are separatist conflict and government conflict. Ross (2012) also distinguishes between these two types of conflicts in his analysis. My hypotheses are based on the assumption that both the likelihood for the onset of internal conflict as well as the type of internal conflict are affected by the type of natural resource exports that a country relies upon.

Some resources are easier to extract, "more lootable", than others. In the literature, secondary diamonds are often referred to as lootable. Other examples of lootable commodities are drugs, such as coca and opium, gemstones, and timber. Oil, on the other hand, is referred to

[1] I am grateful to Ross (2012) for making his data and Stata dofile available on his website.

as a nonlootable resource (Ross, 2004), as are bauxite and mineral gas (Varisco, 2010). The fuel measure by and large covers nonlootable resources. The mineral measure instead comprises lootable resources, such as copper and tin. Out of the two main composite measures that I consider, I assume that the mineral measure has the strongest effect on the likelihood for the onset of internal conflict, because this composite measure contains more lootable resources than the composite fuel measure. It seems reasonable that lootable resources (measured by the mineral measure) have the strongest effect on the likelihood for the onset of internal conflict, because lootable resources are easier to extract than nonlootable resources. Minerals can then be viewed as an economic motvation for rebellions. My arguments are in line with Aslaksen & Andersen (2013), who write that lootable resources, such as minerals, may provide financing for rebel groups. They find that lootability is positively associated with both civil war onset and duration of a conflict, whereas nonlootable resources are not associated with civil war onset.

Resources have different characteristics, which in turn may affect the characteristics of the conflict. In a separatist conflict, a minority tries to become independent from the political union, and in a government conflict, a minority tries to gain control of the whole nation. If the resource is lootable, a local group may not need help from the government in extracting the resource. The local group is able to extract the resource by themselves, and may therefore have incentives to separate from the country, which may potentially lead to a separatist conflict. If the natural resource is nonlootable, it may be challenging for a local group to extract the resource without technological skills or help from the government. To control the natural resource, the rebels have to control the government, which may potentially lead to a government conflict.

Ross (2012, p.183) finds that oil income is significantly linked to both separatist and government conflicts. He writes that "the oil income coefficients are surprisingly similar" for the two types of conflicts. I examine whether fuel exports (% of GDP) and mineral exports (% of total GDP) are significantly linked both to separatist and government conflict. Table 1 indicates the four relationships that are of main interest in this thesis. Fuel exports (% of GDP), a measure consisting mainly of nonlootable resource, should according to my assumptions only be significantly linked to government conflicts (cell B in Table 1), not separatist conflicts (cell A in

Table 1). Mineral exports (% of GDP) may to a greater extent contribute to separatist conflicts (cell C in Table 1), rather than government conflict (cell D in Table 1). The resources included in the mineral measure are easily extracted. But mineral exports (% of GDP) may also have possible effects on the onset of government conflict because rebels may use rents from lootable resources to finance a government conflict. The lootability of the resource makes the financing possible.

Table 1: Four key relationships that are examined

	Separatist conflict	Government conflict
Fuel exports	A	B
Minerals exports	C	D

The interplay between natural resources and internal conflict onsets may be influenced by how democratic the country in question is. Ross (2012, p.71) writes that citizens in a democratic country may not have strong incentives to riot. Taxation is more common in democratic countries, which makes it easier for citizens to have an insight in government spending. When the citizens are better able to keep track of government spending, governments may to a larger extent choose policies that are beneficial to the greater majority, not just a small elite (Ross, 2012, p.6). I briefly examine whether excluding the most democratic countries in the sample changes the regression results.

My thesis proceeds as follows. In the next section, I present a literature review. Further, I present the data and methodology used in my analyses. After this, I present the regression results. Then I discuss the regression results and the implications. Finally, I present my conclusion.

2 Literature Review

There is a vast literature on the effects of resource abundance and resource reliance. I limit my examination to the link between natural resources and internal conflict.[2] In a seminal article from 1998, Collier & Hoeffler examine whether civil wars have economic causes, where natural resources are viewed as an economic cause. They measure natural resource endowment by the share of primary exports in GDP. Primary exports includes both fuels and nonfuels. By using probit and tobit regressions, Collier & Hoeffler (1998) find that natural resource endowment initially increases the risk of internal conflict, but then reduces it. Increased natural resource endowment serves as an economic motivation for rebels. But, when the natural resource level is high, the government gets high rents from the natural resources, making it possible to finance a defence against rebellion (Collier & Hoeffler, 1998). Follow-up articles on the economic causes of civil war are written in 2000 by Collier, and in 2004 by Collier & Hoeffler. In these articles, the division between greed and grievance as explanations for the onset of civil war becomes more prominent. In studies of resource rich countries that experience conflict, it has been speculated whether greed may motivate conflict. Both articles conclude that greed, or economic incentives, is the main explanation for the onset of internal conflict.

Le Billon (2001) writes that there are two reasons why natural resources may contribute to conflict; natural resources increase the risk of conflict by motivating and financing rebel groups, and by weakening the extent to which political institutions can peacefully resolve conflicts. The level of reliance on, and the lootability of a resource may increase the risk of internal conflict (Le Billon, 2001). Le Billon (2001) writes that one cannot reduce internal conflicts to greed driven resource conflicts. One has to take into account that natural resources do play a role in the conflict, while maybe not being the main explanation. Not all countries that are reliant on lootable resources experience internal conflict (Le Billon, 2001). But, Ross (1999) finds empirical evidence that countries that are economically reliant on exports of primary commodities have a higher risk for political instability and conflict.

[2] As summarized by Ross (2012), others have examined the association between natural resources and economic growth, as well as the association between natural resources and political governance.

Lujala et al. (2005) argue that necessary factors for the onset of civil war are motivation, opportunity, and identity. Motivation can be given by either greed or grievance, opportunity means that the rebels have to be able to achieve their goals to initiate a conflict, and identity means that a common identity is necessary for group formation. Natural resources are relevant to all three factors (Lujala et al., 2005). Rebels may be motivated by grievance because natural resources may be an income source for corrupt, incompetent, and repressive governments, and rebels may be motivated by greed because of the high value of managing the government. By looting natural resources, the rebels have an economic opportunity for a rebel movement (Lujala et al., 2005). Further, Lujala et al. (2005) argue that the promise of rents from natural resources may create a group identity. To estimate the effect of resources on the onset of civil war, they use the data set DIADATA, which contains data on primary diamonds and secondary diamonds. This enables them to examine the effect of lootable resources (secondary diamonds), and the effect of nonlootable resources (primary diamonds) on the onset of civil war. Primary diamonds are classified as high value diamonds, while secondary diamonds are classified as low value diamonds. Lujala et al. (2005) find that the production of secondary diamonds increases the risk of onset of mainly ethnic war, but not other types of internal conflicts. Primary diamonds have no effect on the onset of ethnic war, nor other types of internal conflict. Primary diamond deposits are often located underground, making them more challenging to extract, whereas secondary diamond deposits are often located above ground, making them easier to extract. Therefore, the results from Lujala et al. (2005) may support my hypothesis that the mineral measure, containing lootable resources, gives a higher likelihood for the onset of internal conflict.

Reynal-Querol (2002) finds that natural resources is a poor explanation for ethnic civil wars. However, she finds that natural resources is a more important explanation for ideological civil wars and other types of conflicts such as coups or revolutions. Even though Reynal-Querol (2002) does not use the same division of conflict types as I do, her findings are relevant to my analysis, since they suggest that natural resources may not have the same influence on all conflict types. Reynal-Querol (2002) uses the share of natural resources exports in GDP to proxy

for the gains of rebellion. She collects data on primary exports from the World Development Indicators. However, she does not define primary exports, nor divide between different types of natural resources.

Fearon & Laitin (2003) find that the probability for onset of civil war is twice as large in countries that derive at least one-third of export revenues from fossil fuels. They find that the median country has an estimated 10% chance of civil war over a decade, whereas the same country as an oil exporter has an estimated 21% chance of civil war over a decade. They do argue, however, that the direct effect of oil exports may not be as relevant as it appears, since oil income may simply indicate relative state weakness at a given level of income. They argue that oil producers tend to have a weaker government because the government is not reliant on bureaucratic systems to raise revenues. Fearon & Laitin (2003) claim that the most relevant mechanism for the onset of civil war is per capita income level, which is negatively correlated with the onset of civil war. As long as the per capita income level is sufficiently low, a life as a rebel can be attractive to young men. Then it does not matter if the country is democratic (Fearon & Laitin, 2003). They find that civil war onsets are no less frequent in democracies after controlling for income in their regressions. This motivates me to exclude democratic countries in the core model and the extended core model, to examine if the results change.

Bannon & Collier (2003) also write that there is a higher risk of internal conflict in low income countries that are reliant on resources. The risk of civil war increases with reliance on resources, measured as primary commodity exports as a share of GDP. Those countries that rely on oil and gas are more reliant on the resource than those countries relying on copper and tin, as noted by Krüger (2013). In fact, countries that were highly reliant on hard minerals in 2001 had net mineral exports (% of GDP) levels from 5-20%, whereas those countries that were higly reliant on fuel in 2001 had net fuel exports (% of GDP) levels from 18-60% (Krüger, 2013). Bannon & Collier (2003) write that rebel groups need financing, and since most rebel groups are unskilled in regular business activity, they instead turn to extraction and exploitation of primary commodities to finance the riot. Contrary to my hypothesis, Bannon & Collier (2003) write that there is a greater likelihood of separatist conflict when the country has a valuable

resource, such as oil. The people living in the area where the valuable resource is found have incentives to separate from the country, and thereby get all revenues from the resource (Bannon & Collier, 2003). However, Bannon & Collier (2003) claim that there is evidence that rebel leaders exaggerate how valuable the resource is to the rebel group, to build up the movement by recruiting more rebels. Either way, it seems like natural resources can contribute to increased risk of internal conflict in low income countries that rely on resources. Bannon & Collier (2003) write that about 50 armed conflicts in 2001 had a link to exploitation of natural resources.

Ross (2003a, p.64) argues that some natural resources may be more strongly linked to civil war than other, such as secondary diamonds and illegal drugs. Note that secondary diamonds are lootable, which implies that Ross's (2003a, p.64) argument is in line with my hypothesis that mineral exports (% of GDP), consisting mainly of lootable resources, gives a higher likelihood for the onset of civil war. Ross (2003a, p.54) uses fifteen case studies in the '90s to formulate different hypotheses for the relationship between natural resources and civil war.[3] Contrary to my hypotheses, Ross (2003a, p.64) writes that nonlootable resources give separatist conflict, and lootable resources give government conflict. The group living in the area where the non-lootable resource is situated may experience grievance over the uneven distribution of resource revenues, and therefore separate from the nation to get all resource revenues for themselves (Ross, 2003a, p.64). Note that this is the same argument I use for explaining how lootable resources may give separatist conflict. I focus on the fact that the local group is able to extract the lootable resource without help from the government. Further, Ross (2003a, p.67) writes that lootable resources are more likely to produce nonseparatist conflicts, rather than separatist conflict because more revenues for local unskilled workers create fewer grievances. He argues that lootable resources seem to prolong nonseparatist conflict by financing rebel groups.[4]

Smith (2004) studies the relationship between oil wealth and, amongst other things, civil war in the period 1960-1999 in developing countries. His results show that oil wealth is robustly

[3]The fifteen case studies are Afghanistan, Angola (UNITA), Angola (Cabinda), Burma, Cambodia, Colombia, Congo Republic, Democratic Republic of Congo, Indonesia (Aceh), Indonesia (West Papua), Papa New Guinea, Peru, Sierra Leone, and Sudan.

[4]Ross (2003a) divides between separatist conflicts and nonseparatist conflicts, not separatist conflicts and government conflicts. He does not define nonseparatist conflict, but it is reasonable to assume that government conflict is at least one type of nonseparatist conflict.

associated with lower levels of civil war. The collapse of oil prices in the late '80s had no effect on civil war in oil exporting countries even though most of the countries faced higher levels of protest from the people. Smith's (2004) results are contradictory to what other scholars find, since other scholars find that oil is an attractive target to potential rebels, and thereby raise the risk of internal conflict. Humphreys (2005) finds that both oil production per capita and diamond production per capita are positively linked to the onset of civil war. By running regressions using a sample of African countries and a gobal sample, respectively, he finds that the marginal effect of oil is lower in the gobal sample compared to the marginal effect of oil in the Africa sample. It is reasonable to assume that on average, African countries are less democratic than countries situated in the Western world. Examples are Equatorial Guinea with a polity score of -5, Angola with a poltiy score of -2, and Rwanda with a polity score of -4. By comparison Norway has a polity score of +10, France has a polity score of +9, and the United States of America has a polity score of 10 (Marshall & Jaggers, 2010).[5] As for Fearon & Laitin's (2003) arguments, Smith's (2004) findings motivate me to exclude democratic countries in the regressions to examine if the results change.

Basedau & Lay (2009) write that several empirical studies have shown that oil and lootable resources increase the risk of internal conflict on average. However, beyond averages, for every resource reliant or abundant country affected by conflict, two countries seem to avoid conflict. Frankel (2010) examines if mineral riches lead to wars.[6] He concludes that mineral riches can lead to civil war, which is a hinder for development. However, in line with Basedau & Lay (2009), he argues that resource abundant countries are not doomed to fail. Countries such as Norway, Botswana, and Chile have handled their abundance of natural resources well, whereas countries such as Sudan, Bolivia, and Congo have not (Frankel, 2010).

Brunnschweiler & Bulte (2009, p.1) claim that "the conventional measure of resource dependence is endogenous with respect to conflict, and that instrumenting for dependence implies that it is no longer significant in conflict regressions". They find that the relationship can be

[5]The scale goes from -10 to+10, where -10 is hereditary monarchy, and +10 is consolidated democracy.

[6]Frankel (2010) does not define mineral riches. He mentions oil and diamonds in relation to mineral riches/mineral wealth. I get the impression that mineral riches is a general term for natural resources that does not include agriculture, timber, forest, and water.

turned the other way around; conflict increases the reliance on resource extraction. From this, Brunnschweiler & Bulte (2009) conclude that resource abundance should not be regarded as a general curse to peace and development, but rather that resource scarcity may trigger conflict. Brunnschweiler & Bulte (2009) write that the link between resources and war has become more of a stylized fact. By distinguishing between resource reliance and resource abundance, they find that resource reliance initially leads to a higher probability of internal conflict, but then eventually decreases the probability. Resource abundance on the other hand, is negatively correlated with the onset of internal conflict, through an income effect. Brunnschweiler & Bulte (2009) claim that this shows that resource abundant countries have a lower probability of the onset of internal conflict.

Morelli & Rohner (2010) present a theory that internal conflict is more likely to occur when natural resources are unevenly distributed in a country, and when minority groups have a chance of winning a separatist conflict. They argue that in the case of unevenly distributed natural resources, a separatist conflict is more likely to occur than a government conflict. Morelli & Rohner (2010) present empirical results that are consistent with their theory. Historical examples show that the location of natural resources matters. An ethnic group located in a resource abundant area may possibly have incentives to become independent, which will give them increased wealth. This may give incentives to start a separatist conflict (Morelli & Rohner, 2010). Morelli & Rohner (2010) refer to historical examples such as the Aceh separatist movement in Indonesia. From Morelli & Rohner's (2010) theory and empirical results, it seems like uneven distribution of natural resources may give a greater likelihood of separatist conflict rather than a greater likelihood of government conflict.

Thies (2010) examines how primary commodities affect the relationship between civil war and state capacity, rather than how primary commodities affect the onset of civil war. He finds that state capacity does not affect the onset of civil war. Thies (2010) models state capacity as a function of fiscal size and strength. He argues that the onset of civil war reduces state capacity. Contrary to much of the other literature on natural resources and conflict, Thies (2010) finds that primary commodities only affect state capacity directly, not through the onset of civil war.

However, note that this finding does not apply to oil exporters, as Thies (2010) finds that an oil exporter dummy variable in someway plays a direct role for the onset of civil war.

Van der Ploeg (2011) claims that the resource curse is especially severe for point resources such as primary diamonds, and that reliance on resources makes countries more prone to civil war. However, Van der Ploeg (2011) claims that this does not confirm the resource curse. Resource rich countries with institutions of good quality, open trade, high investment in technology, and well developed financial systems have benefited from their wealth of natural resources. Van der Ploeg (2011) writes that there is a need for more research on how to manage revenues from natural resources to create a basis for economic growth and avoidance of conflicts. Van der Ploeg (2011) further writes that many earlier studies on the resource curse regress institutional quality, human capital and such on natural resource reliance only, and calculate the indirect effects of natural resource reliance on growth from the coefficients of these intermediate variables. This strategy may suffer from potential omitted variables bias, and possibly other econometric problems (Van der Ploeg, 2011). Therefore, Van der Ploeg (2011) argues that future empirical work should be based on panel-data, rather than cross-section data, to overcome problems of omitted variable bias.

In the literature, two of the suggested ways in which natural resources can affect the economy are through reduction in growth and increase in poverty. According to Ross (2003b), resource abundant governments may not supply proper eduaction and health care for their people. Insufficient welfare services may lead to poverty followed by low, or even negative economic growth. This may give incentives to riot against the government, because the gains from a riot are more compelling than a life in poverty (Ross, 2003b). By comparison, Bannon & Collier (2003) write that conflict can be harmful to economic growth by, for example, preventing or reducing the access to welfare goods, such as education and health care. This leads to more people being thrown into poverty. It seems like self-enforcing effects may be at work, with a reduction in welfare leading to more conflict and more conflict leading to a reduction in welfare.

Ross (2003b) writes that natural resources can affect the government by reducing their ability to solve a conflict, because of corruption, a weak state, and reduced accountability. When

governments obtain revenues from resources instead of taxes, the government may fail in developing a well functioning bureaucracy. Corruption can contribute in making governments less accountable. The corrupted government tends to favour the rich, because the poor cannot afford to pay bribes (Ross, 2003b). In addition, governments who get their revenues from natural resources tend to become less democratic and thereby less accountable. They use resource revenues to build a strong security force to protect themselves, instead of supplying the people of the country with their necessary needs (Ross, 2003b).

Ross (2003b) argues that natural resources can affect people situated in resource abundant areas by giving them incentives to separate from the country, which could potentially lead to a separatist conflict. The local people may be under the impression that the government acquires revenues from a source that belongs to them, not the government. This may develop a feeling of injustice. In addition, it is the local group that bear the costs of the resource, such as land expropriation and environmental damage. It may be frustrating to only bear the costs, and not enjoy the benefits (Ross, 2003b). Ross (2003b) further argues that natural resources can affect rebel movements by financing their riot. Rebel movements need an income source. Several types of natural resources are not easily moved around, but can produce large profits. These factors make natural resources a desirable income source for rebel groups (Ross, 2003b).

Aslaksen & Andersen (2013) write that natural resource wealth may be used to finance a war, and therefore make armed conflicts more likely. In addition, lootable resources, such as minerals and some types of diamonds, may provide financing for rebel groups. In line with my hypothesis, they write that lootability is positively associated with both civil war onset and duration of a conflict. Aslaksen & Andersen (2013) examine how different types of natural resources are linked to political survival, that the political leadership in a country is maintained over time. They find that the type of resource matters. Nonlootable resources, whose extraction is reliant on technical skills, are positively related to political survival. Lootable resources, whose extraction is not reliant on technical skills, are negatively related to political survival. It seems like rebel groups may use rents from lootable resources to finance an overthrow of the political leadership. Note that Aslaksen & Andersen (2013) distinguish between the effect of

natural resources in democracies and the effect of natural resources in non-democracies in their analysis. I do the same, by excluding democratic countries at different threshold levels.

Throughout his book, Ross (2012) writes that a resource rich country that has a low degree of economic development and bad institutions has a greater likelihood for the onset of civil war compared to both resource poor and resource rich countries with a high degree of economic development and good institutions. He criticizes those who argue that presence of oil in conflict ridden countries is just a coincidence. Ross (2012, p.178) tests four hypotheses in a conflict model. Two of Ross's (2012) hypotheses are that the greater a country's oil income per capita is, the greater is the likelihood of conflict and that oil producing countries have a higher rate of conflicts after 1980 than before 1980.

According to Ross (2012, p.5), oil revenues have four qualities: their scale, source, stability and secrecy. He refers to these qualities as the four Ss. The scale of oil revenues can be massive. The discovery of oil in a low income country can lead to an explosion in government finances. The volume of the revenues makes it easy for authoritarian governments to silence differences of opinion. It can also lead to riot, when people in the country want a larger share of the revenues (Ross, 2012, p.5). The source of the revenues also plays a role. Ross (2012, p.5) writes that when governments are funded by oil there is often no need for taxation of the people. And according to the rentier state theory, a lack of taxation makes the government less constrained by their citizens. The government can therefore experience less public pressure (Mahdavy, 1970). This may explain why so many oil producing states are undemocratic. Ross (2012, p.6) writes that oil revenues are rather unstable. The volatility of world oil prices can give large fluctuations in a government's finances. This may contribute to squandering of their resource wealth. Revenue instability may also exacerbate regional conflicts by making it complicated for governments and rebels to settle their differences (Ross, 2012, p.6). The secrecy of oil revenues links together these problems. Governments can cooperate with international oil companies to hide their transactions. Revenues and expenditures can be concealed by using their own national oil companies. The secrecy makes it easier to conceal greed and incompetence of oil fueled dictators, to remain in power (Ross, 2012, p.6).

3 The Model & Data

My point of departure is the baseline conflict model presented by Ross (2012), where the onset of conflict is the dependent variable, and a measure of resource income is the explanatory variable of main interest. Like Ross (2012), I conduct robustness tests.[7]

Ross (2012, p.14) includes 170 countries that (i) had populations greater than 200 000, and (ii) were sovereign in year 2000. Countries enter the dataset in 1960 or when they became independent if they were under colonial rule in 1960. Because all explanatory variables are lagged by one year, the estimation period is 1961–2006. Ross (2012) excludes countries that ceased existing between 1960 and 2000, respectively South Vietnam, South Yemen and East Germany. He treates Germany as the successor state to West Germany, Vietnam as the successor to North Vietnam, Yemen as the successor to North Yemen, and Russia as the successor to the Soviet Union.[8]

Ross (2012, p.179) writes that he "lags all of the explanatory variables by a single period to help mitigate endogeneity". Ross (2012, p.179) clusters standard errors by country. This is done because residuals will most likely be correlated within each country across years. In addition, Ross (2012, p.179) includes three cubic splines to correct for temporal dependence (Beck, Katz & Tucker, 1998).

Ross (2012, p.179) uses logistic regressions to estimate his model because the dependent variable, the onset of civil war, is binary. The logit model is a standard binary outcome model. It represents the possibility of two mutually exclusive outcomes; either civil war occurs, or civil war does not occur (Cameron & Trivedi, 2009, p.549).

The logit model can be explained in the following way:

$$Pr(Y = 1|X_1, X_2, ..., X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_k) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_k)}}$$

[7] It is beyond the scope of this thesis to go through all of Ross's (2012) robustness tests, such as his distinction between onshore oil and offshore oil.

[8] Ross (2012, p.72) uses the database in Przeworski et al. 2000, updated in Cheibub, Gandhi, and Vreeland (2010).

Where F is the cumulative standard logistic distribution function (Stock & Watson, 2012, p.434). The dependent variable takes the value 1 if civil war occurs, or the value 0 if civil war does not occur, having a logistic distribution function, bounded between 0 and 1 (Amemiya, 1981). In other words, a logit model is a regression where the independent variables explain the probability of moving from one situation (no internal conflict) to another (onset of internal conflict). Note that the logit model does not provide information about the magnitude of an internal conflict.

3.1 The Variables in the Model

The dependent variable in Ross's (2012) baseline model is the onset of internal conflict, constructed from the 2007 Armed Conflict Data set (Version 4). Gleditsch et al. (2002, p.618) define internal conflict as "a contested incompatibility that concerns government and/or territory, where the use of armed force between two parties, at least one which is a government, results in at least 25 battle-related deaths in a single calendar year". Ross (2012) uses this definition, as do I. Ross (2012, p.179) considers two types of civil wars, (i) government conflict, and (ii) separatist conflict. The main independent variable of interest to Ross (2012) is oil income per capita, which is log-transformed.[9] In addition, Ross (2012) introduces several controls.

Ross (2012, p.180) argues that income per capita and population are clearly linked to civil war and includes both as explanatory variables in his baseline model, as do I. Ross (2012) log-transforms both variables, and lags them by one single year. Low income per capita may give incentives to start an internal conflict because people feel they have less to lose. A large population may make a territory more difficult to control and thereby increase the likelihood of separatist conflict (Ross, 2012, p.146). As a robustness test, Ross (2012, p.185) adds several control variables and alternative measures of civil war from Fearon & Laitin (2003), and Sambanis (2004). The control variables added from the Fearon-Laitin model are democracy,

[9]For completeness: In Stata, the natural logarithm of x is constructed both when using the gen ln(x) command and when using the gen log(x) command. That is, in either case, the base is the number e. If constructing the logarithm with base 10 (rather than base e), the command log10(x) would have been used.

democracy squared, ethnic fractionalization, religious fractionalization, mountainous terrain, noncontiguous territory, political instability and new state. Fearon & Laitin (2003) use democracy data from the Polity Project (Polity IV). The so-called polity index measures democracy on a scale from -10 to +10, where -10 is hereditary monarchy and +10 is consolidated democracy (Marshall et al., 2011).[10] The Polity index captures whether there is competitiveness and openness when leaders are recruited, how the chief leaders are constrainted, and whether there is regulation of political participation (Marshall et al, 2011). Fearon & Laitin (2003) consider the Polity IV, the democracy measure constructed by Przeworski et al. (2000), and the Freedom House indicator of civil liberties.[11] Their main measure is the Polity IV measure, but they obtain similar results by using the other measure.

3.2 Before and After the Cold War

Ross (2012, p.156) argues that oil revenues have increased the danger of civil wars since the '80s. He writes that low and middle income oil producing countries are more than twice as likely to have civil wars compared to nonoil producers. The number of oil states increased from 1960 to 2006, mostly due to the rise in oil prices (Ross, 2012, p.158). In addition, the new oil producing countries had different characteristics than older oil producing countries, such as lower incomes. Ross (2012, p.158) argues that the spread of oil production from more wealthy to less wealthy countries has increased the conflict rates of oil producing countries. Ross (2012, p.185) divides the data sample into two periods: the Cold War era (1961-1989) and the post-Cold War era (1990-2006), to test if the rate of civil wars in oil producing countries is higher after the cold war ended. Note that his hypothesis is that the rate of civil wars in oil producing countries is higher after 1980 than before 1980. Civil wars in oil producing countries increased sharply after 1980, while the rate of civil wars in nonoil producing countries were steady throughout the '80s, diverging the gap between conflict rates of oil producing and nonoil producing countries from 1980 (Ross, 2012, p.157). The gap between conflict rates of oil

[10] For measurements of the strength of a state, see Hendrix (2010).

[11] Freedom House divides countries into seven groups. The country groupings are based on points for government compliance with civil liberties and political rights.

producing and nonoil producing countries became more prominent after the Cold War ended, because the Cold War led to a drop in conflict rates of nonoil producing countries (Ross, 2012, p.157). I follow Ross's (2012) procedure by dividing the data sample in two periods, the Cold War era and the post-Cold War era, in the extended version of the core model.

In general, the world is more peaceful today than it was in the early '90s (Ross, 2012, p.146). Fearon & Laitin (2003) write that it is a common opinion that civil wars spread rapidly with the end of the cold war, because of ethnic and religious factors. However, Fearon & Laitin (2003) argue that the civil wars after the Cold War are a result of accumulation of long lasting conflicts since the '50s and the '60s. Collier & Hoeffler (2004) find that the end of the Cold War did not have a significant effect on the onset of civil war. Collier (2000) writes that the world has been safer from internal conflict since 1990. Holding other causes for conflict constant, and adding a dummy variable for the post-Cold War era, Collier (2000) finds that the risk of conflict was half as great during the '90s compared to the risk during the Cold War.

3.3 Measuring Oil

Ross (2012, p.1) uses the term oil, but he makes clear that this measure includes both oil and natural gas. I also use the term oil with reference to Ross's (2012) oil and gas measure. He classifies countries as oil producers if they generate at least one hundred dollars per capita (in 2000 dollars) in income from oil and natural gas in a given year. Ross (2012, p.15) measures oil by a per capita oil income measure. He argues that the benefits of the measure are that it overcomes the endogeneity problems of past measures, and that it can be constructed in a transparent and reliable manner. In addition, data for this measure are available for all countries and all years (Ross, 2012, p.15) for the country sample in the time period that he considers. Ross (2012) achieves this complete country-year coverage by merging in data on oil production from different sources.[12]

Many of the early studies discussing the resource curse use the value of oil exports as a

[12]In general, merging together data for a variable from different sources requires that the variable is defined in exactly the same manner by each source (see e.g. Krüger, 2013), which is reasonable to assume holds in Ross's (2012) case.

fraction of GDP as the independent variable. Using this as the independent variable has two shortcomings, according to Ross (2012, p.15). The first one is that it only measures oil that is exported. The government however gets revenues from both domestic and foreign sales of oil. The second shortcoming is that the measure may be biased upwards in poor countries. This can produce misleading linkages between reliance on oil export and several economic and political characteristics highly correlated with low income countries. If two countries export the same amounts of oil, the value for oil exports as a fraction of GDP will per construction be larger in the poorer country, since the denominator (GDP) is smaller (Ross, 2012, p.15). Furthermore, rich countries will typically consume more of their oil than poor countries. By using the value of oil exports as a fraction of GDP as the independent variable it may seem like the poor oil producing country produce more oil than the rich oil producing country (Ross, 2012, p.15). Other scholars are also sceptical to using primary commodity exports share of GDP as the independent variable (see De Soysa, 2002, Brunnschweiler & Bulte, 2009, and Humphreys, 2005). However, several scholars have used the value of primary exports as a fraction of GDP to proxy for resource reliance (see Collier & Hoeffler, 2004, and Basedau & Lay, 2009). I will return to this in the discussion section.

Ross (2012, p.16) measures total value of oil and gas production, instead of only exports, and he divides it by the country's population. Ross (2012) refers to this variable as oil income per capita. He underlines that the oil income variable itself has an important weakness. The distribution of values among states is highly skewed. Most countries produce small or no amounts of oil, while only a few countries produce massive amounts of oil. This can create problems when the oil income variable is used in regressions (Ross, 2012, p.16). To overcome this problem, he uses the natural log of oil income in the regressions instead, making the distribution of values among states less skewed. I choose to not log-transform my explanatory variables fuel exports (% of GDP) and mineral exports (% of GDP). The distribution of values of fuel exports and mineral exports among states is not highly skewed as for the oil income variable (before log-transforming it). It is true that most countries export small or no amounts of fuel or mineral, and only some countries export larger amount. But the difference between low export

countries and high export countries is not as big as the difference between low producing oil contries and high producing oil countries. For example, the highest value of oil and gas production per capita (in 2000 dollars) is $11,620 in Qatar, and the lowest value of oil and gas production per capita (in 2000 dollars) is $0. By comparison, the highest fuel exports (% of GDP) in year 2000 is 77.4% for Iraq, and the lowest fuel exports (% of GDP) in year 2000 is 0%.

3.4 The Origin Before Log-tranforming

The logarithm is only defined for positive values. Ross (2012) does not explain how he overcomes this problem. However, from Ross's (2012) data file, I observe that he adds the value 1 to countries that have zero oil and gas production, such as Iceland. This is seen from the log-transformed values being equal to 0 for nonproducers. The underlying value must therefore be 1, since $\ln 1 = 0$. When all values are transformed to positive values, Ross (2012) is able to use the natural log of oil income without deleting countries from the regression sample. The regression results obtained when using a log-transformed variable may be affected by what transformation is made for the origin of the underlying variable.[13]

It is not clear simply by observing Ross's (2012) data whether the value 1 is added to all countries or only to the countries with zero oil production before the variable is log-transformed. The log-transformation procedure can be traced from his data, as I now explain. Ross's (2012) oil variable is given by the logarithm of oil income per capita. The actual values of oil and gas production per capita are not included in Ross's (2012) data file. If, for example, the underlying value for Country Z is $9,000$ in a given year, then Ross only records the value 9.104979856 for Country Z in this year, since 9.104979856 is the natural logarithm of $9,000$. By definition $e^{\ln(x)} = x$, which allows me to trace back all the underlying values. In the case of Country Z, I find that $e^{9.104979856} = 9000$. I use the calculation from the constructed example for all country-years. I use the resulting values to check whether Ross has added the value 1 to the per capita oil production value of all countries, not just those with zero oil production.

[13] See Krüger (2013) for a discussion of this topic, applied to a different type of research question and model.

In one of Ross's tables (2012, p.74), he lists a few countries together with their actual per capita oil production values, which are not log-transformed. By comparing the values that I have re-constructed with the values in Ross's (2012) table, I find that Ross (2012) has added the value 1 to the per capita oil production value of all countries. If, for example, a country in Ross's (2012) table has a per capita oil production value of \$8999, then the corresponding log-transformed value in his data file is $\ln(8999+1) = \ln(9000) = 9.104979856$.

It is common to add the value 1 to overcome the problem of nonpositive values when using the natural log. I examine whether the results are affected by how the origin of the underlying log-transformed variable is chosen. I construct a new log-transformed variable. The variable is constructed by adding the value 0.00000000000001 to the original value instead of adding the value 1. That is, Ross's (2012) measure of oil income per capita is given by $\ln(1+x)$, whereas the new constructed measure is given by $\ln(0.00000000000001+x)$, where x is the value of oil and gas production per capita (in 2000 dollars).

The value of oil and gas production per capita is still positive also for countries that do not produce oil, making it possible to use the natural log of oil income without deleting countries from the regression sample. I run the same regression as Ross (2012, p.184). When I replace Ross's (2012) old log-transformed variable with my new log-transformed variable, I get different results. Ross (2012, p.183) finds that oil income is significantly linked to the onset of separatist conflict with a p-value of 0.051. The p-value is increased to 0.115 with my log-transformed variable. When using the new log-transformed variable, oil income is no longer significantly linked to the onset of separatist conflict, which is in line with my hypothesis that nonlootable resources are not linked to the onset of separatist conflict. Ross (2012, p.183) further finds that oil income is significantly linked to the onset of government conflict with a p-value of 0.002. The p-value is increased to 0.10 with my log-transformed variable. And so, oil income just falls short of statistical significance. The results are reported in Table 2.

As seen from Table 3, oil income is significantly linked to government conflict more often than separatist conflict. Also seen from Table 3, adding the value 0.0000000001 to the original value of oil and gas production is the threshold level for when oil income becomes insignificant

for the onset of separatist conflict.

Table 2: Logit. Different origin of the underlying oil variable before log-transforming.

	Separatist conflict (1961-2006)	Separatist conflict (1961-2006)	Government conflict (1961-2006)	Government conflict (1961-2006)
ln(Oil), Ross	0.1326*	—	0.1381***	—
	(0.0679)		(0.0436)	
ln(Oil), different origin	—	0.0194	—	0.0096
		(0.0123)		(0.0058)
Countries	168	168	168	168
Observations	6413	6413	6413	6413

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$. (Standard errors are indicated in parentheses.)
The origin of the oil-variable chosen before it is log-transformed is 1 in Ross (2012). In the second row in Table 2, the origin of the oil-variable chosen before it is log-transformed is 0.00000000000001.
Other variables in the regression are income (log), population (log), peaceyears, spline one, spline two, spline three.

Table 3: Replacing the value 1 with an infinitesimal value when log-transforming oil per capita.

Value added	Separatist conflict (p-value)	Government conflict (p-value)
1.0	0.051	0.002
0.1	0.038	0.005
0.01	0.043	0.012
0.001	0.053	0.021
0.0001	0.063	0.031
0.00001	0.073	0.040
0.000001	0.081	0.049
0.0000001	0.087	0.057
0.00000001	0.093	0.065
0.000000001	0.098	0.072
0.0000000001	0.102	0.079
0.00000000001	0.106	0.085
0.000000000001	0.109	0.090
0.0000000000001	0.112	0.095
0.00000000000001	0.115	0.10

Other variables in the regression are income (log), population (log), peaceyears, spline one, spline two, spline three.

I run a regression where I drop all oil income observations where oil income equals zero. I do this to check if the results match the results from adding the infinitesimal value instead of 1. Oil income is not significant for separatist conflict (same result), with a p-value of 0.304. It is however significant for government conflict with a p-value of 0.003. This is in line with my hypothesis. The results are reported in Table 4.

Table 4: Logit. Drop all observations where oil income equals zero, 1961-2006.

Dependent variable	Separatist conflict (1961-2006)	Government conflict (1961-2006)
Income (log)	-0.4376 **	-0.4150***
	(0.1986)	(0.1121)
Population (log)	0.4804***	0.0891
	(0.1463)	(0.0812)
Oil income (log)	0.0913	0.2276***
	(0.0888)	(0.0774)
Countries	98	98
Observations	3201	3201

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$.
(Standard errors are indicated in parentheses.)
Other variables in the regression are peaceyears, spline one, spline two, spline three.

When dividing the sample into two periods, the Cold War era and the post-Cold War era, Ross (2012, p.181) finds that oil income is only significantly linked to the onset of internal conflict in the post-Cold War era. Once again, I replace the value 1 with different infinitesimal values when log-transforming oil income per capita, to examine if oil income loses significance for the onset of internal in the post-Cold War era. However, oil income is still significantly linked to the onset of internal conflict, at a 1% significance level, and a 5% significance level, which gives new support to Ross's (2012, p.181) findings. P-values for the log-transformed oil income per capita variable with different infinitesimal values are reported in Table 5.

Table 5: Replacing the value 1 with an infinitesimal value when log-transforming oil per capita.

Value added	Internal conflict onset (1990-2006) (p-value)
1.0	0.000
0.1	0.000
0.01	0.001
0.001	0.002
0.0001	0.002
0.00001	0.003
0.000001	0.005
0.0000001	0.006
0.00000001	0.007
0.000000001	0.007
0.0000000001	0.008
0.00000000001	0.009
0.000000000001	0.010
0.0000000000001	0.011
0.00000000000001	0.011
0.000000000000001	0.012
0.0000000000000001	0.012
0.00000000000000001	0.013
0.000000000000000001	0.013
0.0000000000000000001	0.014
0.00000000000000000001	0.014
0.000000000000000000001	0.015
0.0000000000000000000001	0.015
0.00000000000000000000001	0.015
0.000000000000000000000001	0.016

Other variables in the regression are income (log), population (log), peaceyears, spline one, spline two, spline three.

4 Merging in New Data

I replicate Ross's (2012, p.179) conflict model by introducing other measurements of natural resources, (i) fuel and (ii) minerals.[14] Several of the authors in the literature use primary exports, and as a novelty I distinguish between fuel exports and mineral exports. The resource data are provided by the World Bank.[15] Fuel comprises petroleum, coal and natural gas as the main commodities. Minerals includes commodities like copper, tin, aluminium, nickel and silver. Nonindustrial diamonds and gold are not included (Krüger, 2013). I use these alternative measurements of natural resources to test my hypotheses.

[14]For detailed explanations of the variables included in the regressions see Table A.1 in the appendix.

[15]The World Bank uses the term 'ores and metals' instead of 'minerals'.

I merge data from the World Bank into Ross's (2012) data file.[16] When merging in the World Bank data, I exclude the countries that are not included in Ross's (2012) data set. Yugoslavia and Taiwan, initially included in Ross's (2012) data, are also excluded in the regression analysis, since there are no data on these observation units from the World Bank.[17]

4.1 Reliance on Fuel and Minerals Exports

The World Bank provides data on fuel exports (% of merchandise exports), mineral exports (% of merchandise exports), merchandise exports (current US dollars), and GDP (current US dollars). I use these data to construct my two resource measures, fuel exports (% of GDP) and mineral exports (% of GDP). This has been done by several researchers, such as Sachs & Warner (1995) and followers. Krüger (2013) goes through the construction of the different ratios that I use in my analysis.

For some country-years, merchandise exports (current US dollars) is reported to be larger than GDP. Merchandise exports (current US dollars) is reported to be larger than GDP for the following country-years: Angola (1997-2002), Bahrain (1980-1982), The Bahamas (1974-1983), Brunei Darussalam (1971), Equatorial Guinea (1962-1964), Liberia (1990, 1992-1999), Malaysia (1998-2000, 2004), Singapore (1961-1966, 1974, 1976-2006), and Suriname (1990). For some countries, a possible explanation is that the country is a trading port, and that re-exports are included in the figures, but the World Bank does not provide information on this (Humphreys, 2005). In any case, I set these country-years values to missing before I run the regressions.

For a few country-years, fuel exports (% of GDP) and mineral exports (% of GDP) are reported to be larger than 100%. Fuel exports is reported to be larger than 100% for the following country-years: Laos (1962-1967, 1969-1973) and Qatar (1972). Mineral exports is reported to be larger than 100% for Suriname (1962). This could potentially be because of bad quality of the data for these early years in the sample. The high values appear in the years 1962-1973. In

[16] The data sets use the same country codes, which greatly facilitates the merging procedure.

[17] Ross's (2012) data were downloaded Jan 28, 2013. Ross's (2012) do-file was downloaded Jan 31, 2013. Data from the World Bank were downloaded Jan 28, 2013.

1963, Laos's fuel exports (% of GDP) is reported to be as large as 723%. To avoid bias results in the regression analysis, I set these values to missing.

4.2 A Binary Measure of Resources

Ross (2012, p.16) uses a binary measure of oil income. He denotes countries that generate at least one hundred dollars per capita in oil income (in constant 2000 dollars) in a given year, as oil producers. The binary measure of oil income takes the value 1 when countries are oil producers, and the value 0 otherwise (Ross, 2012, p.104). Ross (2012, p.16) uses the binary measure of oil income to retest all of his findings, because even though the natural log of oil income makes the distribution of values less skewed, the natural log of oil income still has a nonnormal distribution. I generate two new binary measures, using the data for fuel exports and mineral exports. The binary measure of fuel exports denotes countries that have at least 20% fuel exports of GDP, such as Saudi Arabia, Kuwait, and Norway. The binary measure of mineral exports denotes countries that have at least 5% mineral exports of GDP, such as Chile, Peru and Zambia. I choose the thresholds to be able to classify countries as mineral exporters or fuel exporters.

4.3 Summary Statistics

I attempt to make my examination of the data as transparent as possible. Therefore, I supplement the regression analysis with tables to give an overview of the data. Ross (2012, p.23) argues that "transparency can encourgage governments to better manage their oil revenues; maybe it can also encourage social scientists to be more careful in their analyses".

I follow Krüger (2013) and distinguish between the top fuel exporters and mineral exporters, by using data from the World Bank. I also include important export goods for each country, from years 1999-2000, in both tables. Data on important export goods are provided by the UNCTAD Handbook of statistics (2002).

From Ross's data,[18] I find that Qatar produced the highest amount of oil and gas per capita ($11,620) in 2000 and that Middle Eastern countries dominate among the world's oil and gas producers. Among the countries defined as oil producers by Ross (2012) in 2000, Egypt has the lowest value of oil and gas production ($101 per capita). Table 6 shows that Iraq was the country with the highest fuel exports (% of GDP) in 2000. Just as according to Ross's definition of oil producers, and as pointed out by Krüger (2013) with similar data to those in Table 6, many of the countries in Table 6 are located in the Middle East. Table 7 shows that Tajikistan had the highest mineral exports share of total GDP in 2000. As stressed by Krüger (2013), many of the countries that rely on minerals are located in Africa.

Table 6: Countries classified as fuel exporters, 2000.

Country	Fuel exports (% of GDP)	Important export goods
Iraq	77.4	No report on specific goods
Turkmenistan	69.9	Natural gas, refined petroleum products
Qatar	59.6	Crude petroleum, natural gas
Kuwait	48.6	Crude petroleum, refined petroleum products
Oman	47.0	Crude petroleum
Nigeria	45.4	Crude petroleum
United Arab Emirates	45.0	Crude petroleum
Gabon	42.7	No report on specific goods
Yemen	41.0	Crude petroleum
Algeria	39.1	Natural gas and crude petroleum
Saudi Arabia	38.0	Crude petroleum, refined petroleum products
Trinidad and Tobago	34.2	Refined petroleum products, crude petroleum
Azerbaijan	28.2	Crude petroleum, refined petroleum products
Kazakhstan	25.9	Crude petroleum
Iran	25.3	Crude petroleum
Venezuela	24.7	Crude petroleum, refined petroleum products
Norway	22.8	Crude petroleum, natural gas
Russia	20.6	Crude petroleum, natural gas

Data source: The World Bank, and UNCTAD HANDBOOK OF STATISTICS, 2002.

[18] As explained previously, these values are not directly available but can be traced back by using the formula $e^{\ln(x)} = x$.

Table 7: Countries classified as mineral exporters, 2000.

Country	Mineral exports (% of GDP)	Important export goods
Tajikistan	51.0	Aluminium
Papa New Guinea	30.5	Ores and concentrates of precious metal and waste
Zambia	20.3	No report on specific goods
Mongolia	19.5	Ores and concentrates of base metals
Guyana	14.6	Non-monetary gold
Guinea	14.1	No report on specific goods
Bahrain	12.6	No report on specific goods
Mauritania	12.5	Iron ore and concentrates
Chile	11.0	Copper, base metal ores
Kazakhstan	9.0	Copper
Togo	7.2	Crude fertilizers, iron and steel shapes
Niger	6.4	Uranium, thorium ores
Ghana	6.3	Non-monetary gold, Aluminium
Ukraine	5.6	No report on specific goods
Peru	5.2	Non-monetary gold, copper

Data source: The World Bank, and UNCTAD HANDBOOK OF STATISTICS, 2002.

In Table 8, I distinguish between (i) overall, (ii) between, and (iii) within variation. Between variation here refers to variation across countries, whereas within variation refers to variation from the mean in a country, or variation over time (Cameron & Trivedi, 2009, p.245). Most of the variation is between variation, not within variation. Overall variation in oil income per capita has a global mean of \$640, and a standard deviaton of \$3,380.[19] For overall variation, the minimum value of oil income per capita is \$0, while the maximum value of oil income per capita is \$69,343. This maximum value of oil income per capita is from Qatar in 1980. Between variation has a standard deviation of \$2,615. Within variation has a standard deviation of \$2,150.[20] The variation is obtain by squaring the standard deviations. I then find that about 60% of overall variation is due to between variation, and about 40% of overall variation is due to within variation.

Overall variation in fuel exports (% of GDP) has a global mean of 5.5%, and a standard deviation of 12.9%. For overall variation, the minimum value of fuel exports (% of GDP) is

[19] I find this by using the command xtsum i STATA. I use the original value of oil income per capita, instead of the natural log og oil income per capita to get more understandable numbers.

[20] All dollar values are in 2000 dollars.

0%, while the maximum value of fuel exports (% of GDP) is 95.0%. Between variation has a standard deviation of 11.6%. Within variation has a standard deviation of 5.7%. About 80% of overall variation is due to between variation, and about 20% of overall variation is due to within variation.

Overall variation in mineral exports (% of GDP) has a mean value of 2.3%, and a standard deviation of 6.3%. For overall variation, the minimum value of mineral exports (% of GDP) is 0%, while the maximum value of mineral exports (% of GDP) is 72.7%. Between variation has a standard deviation of 7.3%. Within variation has a standard deviation of 2.9%. When I calculate how much of overall variation is due to between and within, I get that 135% of overall variation is due to between variation. This cannot be correct. The error may be due to unbalanced data. Some countries have very few observations.[21] In addition, on average there are only 27 years with observations for each country for mineral exports (% of GDP).

Note that N, total number of country-years observations, are different for the three variables. The variable oil and gas production per capita has 7,728 country-years observations, the variable fuel exports (% of GDP) has 4,134 country-years observations, and the variable mineral exports (% of GDP) has 4,271 country-years observations. Clearly there are more missing values for mineral exports (% of GDP), and fuel exports (% of GDP) than for oil income per capita. The differences in country-years observations may influence my results, which I return to in the discussion of my results.

[21] See section A.2 in the appendix for overview of country-years observations for mineral exports (% of GDP).

Table 8: Xtsum. Variation in oil and gas production per capita, fuel exports, and mineral exports.

Variable	Variation	Mean	Standard deviation	Min	Max	Observations
oil and gas production per capita	overall	641	3,380	0	69,343	N=7728
	between		2,615			n=168
	within		2,150			T-bar=46
fuel exports (% of GDP)	overall	5.5	12.9	0	95.0	N=4134
	between		11.6			n=165
	within		5.7			T-bar=26
mineral exports (% of GDP)	overall	2.3	6.3	0	72.7	N=4271
	between		7.3			n=165
	within		2.9			T-bar=27

Data source: Ross (2012) and the World Bank.

5 Regression Results

Cameron & Trivedi (2009, p.343) explain that a marginal effect measures the effect of a change in a regressor x, on the conditional mean of y. In linear models, the marginal effect equals the relevant slope coefficient. In nonlinear models, such as the logit model, the marginal effect does not equal the relevant slope coefficient. The sign of the coefficient gives the direction of the effect, but not the actual marginal effect (Cameron & Trivedi, 2009, p.464). Hill et al. (2012, p.596) write that

$$\hat{\beta}_{Logit} \simeq 4\hat{\beta}_{OLS} \tag{1}$$

Cameron & Trivedi (2009, p.465) write that it can be shown that for logit models

$$\frac{\delta p}{\delta x_j} \leq 0.25\hat{\beta}_j \tag{2}$$

Where p is the probability of internal conflict onset. Bårdsen & Nymoen (2011, p.185) show how one can calculate the predicted probability change of a marginal increase in the given

explanatory variable. It is per definition given by:

$$\frac{\widehat{\delta p}}{\delta OilPerCapita} = (1 - \hat{p}_i) \times \hat{p}_i \times \hat{\beta}_{OilPerCapita} \tag{3}$$

There are many different methods for calculating marginal effects in nonlinear models (Cameron & Trivedi, 2009, p.343). Three variants of marginal effects are; average marginal effects (AME), marginal effects at a representative value (MER), and marginal effects at the mean (MEM). For the logit model, one may use the marginal effect at the mean to comment on changes in the probability of y conditional on changes in x (Cameron & Trivedi, 2009, p.476). To compute the MEM, I use the command margins, dydx(x) atmean. This gives me the marginal effect of x on y, at the mean of the independent variables included in the regression (Cameron & Trivedi, 2009, p.480). Note that the marginal effect of an explanatory variable in the logit model depends on the values of the other explanatory variables included in the regression. In other words, the marginal effect of x on y is not constant. For simplicity one set the other explanatory variables to their mean values when calculating marginal effects at the mean.

Marginal effects at the mean, hereafter referred to as marginal effects, are reported throughout the section. Ross (2012) does not comment on the marginal effects of oil income on the onset of internal conflict.

When Ross (2012, p.182) estimates his baseline model, the estimated coefficient for the oil income variable is 0.1331. The associated marginal effect, computed by using the command margins, dydx(oil income) atmean, is 0.003. A 10% increase in oil income per capita (a change of 0.1 in oil income per capita), is associated with an increase of 0.0003 in the probability for the onset of internal conflict.

Table 9 shows the regression results when replacing fuel exports (% of GDP) with oil income in the core model. Unlike oil income, fuel exports (% of GDP) is not significant for the onset of civil war. Table 10 shows that mineral exports (% of GDP) is not significantly linked to the onset of civil war in the core model. My hypothesis is that mineral exports (% of GDP) gives a higher likelihood for the onset of civil war, whereas fuel exports (% of GDP) gives a

lower probability for the onset of civil war. My findings in Table 10 are not in line with my hypothesis. I will give further comments on this in the discussion.

Table 9: Logit. Civil war onsets, fuel exports (% of GDP), 1961-2006.

Dependent variable	Civil war onset	Civil war onset
	(all countries)	(all countries)
	(1961-2006)	(1961-2006)
Income (log)	-0.3166***	-0.3901***
	(0.0612)	(0.0743)
Population (log)	0.3144***	0.3615***
	(0.0726)	(0.0759)
Fuel exports (% of GDP)	—	0.0075
		(0.0083)
Countries	168	162
Observations	6413	4094

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$.
(Standard errors are indicated in parentheses.)
Other variables in the regression are:
income (log), population (log), peaceyears, spline one, spline two, spline three.

Table 10: Logit. Civil war onsets, mineral exports (% of GDP), 1961-2006.

Dependent variable	Civil war onset	Civil war onset
	(all countries)	(all countries)
	(1961-2006)	(1961-2006)
Income (log)	-0.3166***	-0.4035***
	(0.0612)	(0.0713)
Population (log)	0.3144***	0.3828***
	(0.0726)	(0.0754)
Mineral exports (% of GDP)	—	0.0182
		(0.0117)
Countries	168	162
Observations	6413	4225

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$.
(Standard errors are indicated in parentheses.)
Other variables in the regression are:
income (log), population (log), peaceyears, spline one, spline two, spline three.

Fuel exports (% of GDP) and mineral exports (% of GDP) may not be significantly linked to the onset of civil war because democratic countries are included in the sample. I exclude democratic countries to examine if the results in the core model change. The polity variable in Ross's (2012) data set has a minimum value of 1, and a maximum value of 10. I exclude countries at different polity scores. First I exclude countries with a polity score lower than or equal to 9 and run the regression, then I exclude countries with a polity score lower than or equal to 8 and run the regression, and so on. The results from the core model do not change when I exclude democratic countries. The p-values are reported in Table 11 and Table 12.

Table 11: P-values. Excluding democratic countries from the core model. Fuel exports (% of GDP).

Polity score <=	Internal conflict onset (p-value)
9	0.826
8	0.740
7	0.888
6	0.824
5	0.517
4	0.426
3	0.442
2	0.399

Variables included in the regression are: fuel exports (% of GDP), income (log), population (log), peaceyears, spline one, spline two, spline three.

Table 12: P-values. Excluding democratic countries from the core model. Mineral exports (% of GDP).

Polity score <=	Internal conflict onset (p-value)
9	0.563
8	0.845
7	0.754
6	0.640
5	0.441
4	0.462
3	0.935
2	0.476

Variables included in the regression are: mineral exports (% of GDP), income (log), population (log), peaceyears, spline one, spline two, spline three.

I extend the core model by introducing two different types of internal conflicts, and separating the period considered into two periods, respectively the Cold War era, and the post-Cold War era. Ross (2012, p.182) finds that oil income per capita is only significant for the onset of civil war in the post-Cold War era, not in the Cold War era. In the post-Cold War era, the coefficient for oil income is 0.2065. The associated marginal effect is 0.003. A 10% increase of oil income is associated with an increase of 0.0003 in the probability for civil war onset in the post-Cold War era. The fact that oil income per capita is significantly linked to civil war onsets in the post-Cold War era, does not necessarily imply that the number of internal conflicts has increased since the Cold War. However, one may conclude thar factors for civil war onsets have changed since the Cold War. Oil income is significantly linked to the onset of both separatist and government conflicts at significance levels of respectively 10% and 1%. Oil income has coefficient 0.1345 when regressed on separatist conflict. The associated marginal effect is 0.0006. An increase of 10% in oil income per capita, is associated with an increase of 0.00006 in the probability of a separatist conflict occuring. Oil income has coefficient 0.1383 when regressed on government conflict. The associated marginal effect is 0.002. An increase of 10% in oil income per capita, is associated with an increase of 0.0002 in the probability of a government conflict occuring.

Table 13: Logit. Separatist and government conflicts, fuel exports (% of GDP), 1961-2006.

	(1)	(2)	(3)	(4)
Dependent variable	All conflicts (1961-1989)	All conflicts (1989-2006)	Separatist conflict (1961-2006)	Government conflict (1961-2006)
Income (log)	-0.3921***	-0.4021***	-0.3867**	-0.3535***
	(0.0920)	(0.1153)	(0.1675)	(0.0926)
Population (log)	0.2912***	0.4480***	0.7087***	0.0858
	(0.0717)	(01305)	(0.1041)	(0.0704)
Fuel exports (% of GDP)	0.0004	0.0138	0.0213	-0.0019
	(0.0155)	(0.0107)	(0.0130)	(0.0112)
Countries	117	156	162	162
Observations	2142	1952	4094	4094

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$. (Standard errors are indicated in parentheses.)
Other variables in the regression are: peaceyears, spline one, spline two, spline three.

Unlike oil income, fuel exports (% of GDP) is not significantly linked to civil war onsets in the post-Cold War era (see Table 13). While oil income is significantly linked to both separatist and government conflicts, fuel exports (% of GDP) is not linked to either two conflict types. Note that one of my hypothesis is that fuel exports (% of GDP) has a stronger effect on the onset of government conflict, than for the onset of separatist conflict. My results in Table 13 are not in line with my hypothesis.

Table 14 shows that mineral exports (% of GDP) is not significantly linked to the onset of civil war in the Cold War era nor in the post-Cold War era. Unlike fuel exports (% of GDP), mineral exports (% of GDP) is linked to separatist conflict, in line with my hypothesis. Mineral exports (% of GDP) has coefficient 0.0370 when regressed on separatist conflict. The marginal effect has a value 0.0001. A 1% increase in mineral exports (% of GDP) is associated with an increase of 0.01% in the probability of a separatist conflict occuring.

Table 14: Logit. Separatist and government conflicts, mineral exports (% of GDP), 1961-2006.

	(1)	(2)	(3)	(4)
Dependent variable	All conflicts (1961-1989)	All conflicts (1989-2006)	Separatist conflict (1961-2006)	Government conflict (1961-2006)
Income (log)	-0.3974***	-0.4359***	-0.4275***	-0.3625***
	(0.0926)	(0.1056)	(0.1620)	(0.0897)
Population (log)	0.3296***	0.4242***	0.6732***	0.1335*
	(0.0682)	(0.1266)	(0.0952)	(0.0689)
Mineral exports (% of GDP)	0.0164	0.0067	0.0370*	0.0078
	(0.0126)	(0.0265)	(0.0192)	(0.0145)
Countries	118	157	162	162
Observations	2205	2020	4225	4225

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$. (Standard errors are indicated in parentheses.)
Other variables in the regression are: peaceyears, spline one, spline two, spline three.

As for the core model, I exclude democratic countries from the regressions used in Table 13 and Table 14, to check if the results change. I use the same procedure. The p-values are reported in Table 15 and Table 16. When I exclude democratic countries and regress fuel exports (% of GDP) on internal conflict in the two periods, on separatist conflict, and on government conflict, respectively, there are changes in the significance of fuel exports (% of GDP) on separatist conflict and government conflict. Note that fuel exports (% of GDP) is significantly linked to separatist conflict for almost all threshold levels I choose for excluding democratic countries. It is only significantly linked to government conflict when I exclude countries with a polity score higher than 9, and countries with a polity score higher than 8, respectively.

Table 15: P-values. Excluding democratic countries from the extended core model. Fuel exports (% of GDP).

Polity score <=	Internal conflict 1961-1989 (p-value)	Internal conflict 1990-2006 (p-value)	Separatist conflict 1961-2006 (p-value)	Government conflict 1961-2006 (p-value)
9	0.584	0.269	0.012	0.062
8	0.845	0.482	0.013	0.082
7	0.836	0.743	0.098	0.141
6	0.977	0.852	0.080	0.154
5	0.858	0.590	0.085	0.288
4	0.888	0.452	0.072	0.282
3	0.769	0.719	0.080	0.358
2	0.998	—	0.893	0.301

Variables included in the regression are: fuel exports (% of GDP), income (log), population (log), peaceyears, spline one, spline two, spline three.
— indicates that there are too few observations to calculate p-values.

When I exclude democratic countries and regress mineral exports (% of GDP) on internal conflict in the two periods, on separatist conflict, and on government conflict, respectively, there are few changes. Mineral exports (% of GDP) is still insignificant for internal conflict in both periods, and for government conflict. In Table 14, I find that mineral exports (% of GDP) is significantly linked to separatist conflict. However, when I exclude democratic countries, mineral exports (% of GDP) is not significantly linked to separatist conflict.

Table 16: P-values. Excluding democratic countries from the extended core model. Mineral exports (% of GDP).

Polity score <=	Internal conflict 1961-1989 (p-value)	Internal conflict 1990-2006 (p-value)	Separatist conflict 1961-2006 (p-value)	Government conflict 1961-2006 (p-value)
9	0.748	0.893	0.636	0.729
8	0.953	0.903	0.631	0.965
7	0.895	0.612	0.346	0.875
6	0.920	0.723	0.353	0.986
5	0.618	0.489	0.185	0.952
4	0.700	0.279	0.230	0.984
3	0.985	0.340	0.371	0.697
2	0.584	—	—	—

Variables included in the regression are: mineral exports (% of GDP), income (log), population (log), peaceyears, spline one, spline two, spline three.
— indicates that there are too few observations to calculate p-values.

Ross (2012, p.185) runs a robustness test, to retest his findings. By replacing oil income with a binary measure of oil, Ross (2012, p.186) examines whether his results hold. The binary measure of oil is statistically significant for the onset of civil war for all states and periods. When he splits the sample in two, respectively the Cold War era (1961-1989) and the post-Cold War era (1990-2006), the binary measure of oil is only statistically significant for the onset of civil war in the post-Cold War era.

As an extension of Ross's (2012) analysis, I regress the binary measure of oil on separatist conflict and government conflict. The binary variable of oil income is significantly linked to government conflict with a p-value of 0.001, but not significantly linked to separatist conflict. In other words, when I exclude countries with a low level of oil income per capita, oil income per capita is only linked to government conflict, not separatist conflict. This finding supports my hypothesis that nonlootable resources should only increase the likelihood for government conflict, not separatist conflict. The results from the robustness test are reported in Table 17.

Table 17: Logit. Binary measure of oil income. 1961-2006.

	(1)	(2)	(3)	(4)	(5)
Dependent variable	All conflicts (1961-2006)	All conflicts (1961-1989)	All conflicts (1990-2006)	Separatist conflict (1961-2006)	Government conflict (1961-2006)
Income (log)	-0.4093***	-0.2787***	-0.5635***	-0.4133**	-0.4004***
	(0.0667)	(0.0744)	(0.1072)	(0.1595)	(0.0743)
Population (log)	0.2950***	0.2771***	0.3137***	0.5852***	0.074
	(0.0765)	(0.3112)	(0.0886)	(0.1045)	(0.0558)
Oil income (binary)	0.7098***	0.2922	0.9822***	0.5892	0.8695***
	(0.2445)	(0.3112)	(0.3123)	(0.3579)	(0.2652)
Countries	168	155	168	168	168
Observations	6413	3618	2795	6413	6413

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$. (Standard errors are indicated in parentheses.)
Other variables in the regression are: peaceyears, spline one, spline two, spline three.

Next, I replace the binary measure of oil, with a binary measure of fuel exports (% of GDP), and run the same robustness test. The binary measure of fuel exports (% of GDP) is not statistically significant for the onset of civil war. When I distinguish between the Cold War era and the post-Cold War era, I find that the estimated effect of the binary fuel exports variable is only statistically significant in the post-Cold War era, with a p-value of 0.012. This confirms Ross's

(2012) hypothesis that nonlootable resources are positively linked to civil war onset in the post-Cold war era. The binary fuel exports variable is not significantly linked to government conflict and separatist conflict. The results indicate that there is no significant link between the onset of civil war and fuel exports in countries classified as fuel exporting countries, except for in the post-Cold War era. The results are reported in Table 18.

Table 18: Logit. Binary measure of fuel exports (% of GDP). 1961-2006.

	(1)	(2)	(3)	(4)	(5)
Dependent variable	All conflicts (1961-2006)	All conflicts (1961-1989)	All conflicts (1990-2006)	Separatist conflict (1961-2006)	Government conflict (1961-2006)
Income (log)	-0.3901***	-0.3848***	-0.4105***	-0.3796**	-0.3647***
	(0.0741)	(0.0921)	(0.1188)	(0.1612)	(0.0936)
Population (log)	0.3623***	0.2904***	0.4577***	0.7000***	0.0884
	(0.0757)	(0.0719)	(0.1317)	(0.0980)	(0.0708)
Fuel exports (binary)	0.3720	-0.9757	0.9792**	0.4878	0.3193
	(0.3087)	(1.0423)	(0.3855)	(0.5591)	(0.4152)
Countries	162	118	157	162	162
Observations	4225	2205	2020	4225	4225

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$. (Standard errors are indicated in parentheses.)
Other variables in the regression are: peaceyears, spline one, spline two, spline three.

I also check if a binary measure of mineral exports (% of GDP) is statistically significant for the onset of civil war. The regressor is significantly linked to the onset of civil war for all states and periods, and in the Cold War era. Contrary to my hypothesis and the results from the extended core model, the binary measure of mineral exports (% of GDP) is significantly linked to government conflict, not separatist conflict. The results are reported in Table 19.

Table 19: Logit. Binary measure of mineral exports (% of GDP). 1961-2006.

	(1)	(2)	(3)	(4)	(5)
Dependent variable	All conflicts (1961-2006)	All conflicts (1961-1989)	All conflicts (1990-2006)	Separatist conflict (1961-2006)	Government conflict (1961-2006)
Income (log)	-0.3973***	-0.3955***	-0.4355***	-0.4266***	-0.3500***
	(0.0717)	(0.0942)	(0.1066)	(0.1602)	(0.0916)
Population (log)	0.3946***	0.3533***	0.4230***	0.6697***	0.1526**
	(0.0769)	(0.0697)	(0.1272)	(0.0953)	(0.0715)
Mineral exports (binary)	0.5256***	0.7250***	0.0673	0.5471	0.5394*
	(0.2003)	(0.2563)	(0.4605)	(0.5535)	(0.3149)
Countries	162	118	157	162	162
Observations	4225	2205	2020	4225	4225

I use significance levels of $^{\star}p<0.10$, $^{\star\star}p<0.05$, $^{\star\star\star}p<0.01$. (Standard errors are indicated in parentheses.)
Other variables in the regression are: peaceyears, spline one, spline two, spline three.

6 Discussion

I hypothesize that mineral exports (% of GDP) has the highest likelihood for the onset of civil war. The results from the core model show that neither mineral exports (% of GDP) nor fuel exports (% of GDP) are significantly linked to the onset of civil war. Oil income per capita is significantly linked to the onset of civil war. Collier & Hoeffler (2000) write that the perceived rents from natural resources provide economic motivation for an internal conflict. The reason for why oil income per capita is significantly linked to the onset of civil war, while mineral exports (% of GDP) is not, may be because their revenues differ. In other words, mineral exports (% of GDP) provide lower perceived rents than oil and gas.

I write in the literature review that oil revenues have four qualities: their scale, source, stability and secrecy. These revenue qualities may make an oilproducing country more prone to internal conflict compared to a mineral exporting country. Mineral revenues may not have the same qualities as oil revenues, and therefore not lead to a higher probability of internal conflict. The scale of revenues from lootable resources may not be as massive as the scale of revenues from nonlootable resources. This may contribute to (i) a lower probability of a riot, because the people in a country with lootable resources do not necessarily view the revenues from the lootable resource as very appealing. (ii) On the other hand, the smaller scale

of lootable resources may make the government less able to silence differences of opinion, because their government finances are not that large. This could produce a higher likelihood for internal conflict, but it seems like the first aspect of the scale of revenues from lootable resources outweighs the second aspect, since the regression results show that mineral exports (% of GDP) is not significantly linked to civil war onset in the core model.

Lootable resources and nonlootable resources differ in their source. Nonlootable resources make the government less reliant on taxation. Due to the smaller scale of lootable resources, governments in lootable resource abundant countries may be more reliant on taxation for financing their government spending. This makes the country more constrained by their citizens, and therefore the country may be more democratic. An internal conflict may be less likely in a democratic country, implying that lootable resources may possibly give a lower probability of internal conflict, in line with my regression results.

It is uncertain how unstable revenues from lootable resources are compared to how unstable revenues from nonlootable resources are. It is possible that mineral exporting countries do not experience the same fluctuations in their government finances as oil producing countries do when world resource prices fluctuate. The mineral exporting country may therefore not squander their resource wealth, an action that may lead to grievance over uneven resource wealth distribution. In future research it would be interesting to construct new measures of natural resources that capture the volatility of resource revenues, their related secrecy, and how these affect the government revenue sources. This is beyond the scope of the thesis.

Ross (2012, p.6) writes that the secrecy of oil revenues links together the problems of the scale, source, and instability qualities of oil revenues. Maybe revenues from lootable resources are not that secret compared to revenues from nonlootable resources, making it more difficult to conceal greed and incompetence of leaders in the mineral exporting country. This may imply that leaders do not dare to be greedy, and therefore the probability of internal conflict is lower because there are no grievances. But it may also imply that there are grievances due to transparency of how greedy and incompetent the leaders of the country are, increasing the probability of internal conflict.

Nevertheless, if the difference between oil revenues and mineral revenues makes an oilproducing country more prone to internal conflicts than a mineral exporting country, then fuel exporting countries should also be more prone to internal conflicts, because fuel exports consists mainly of nonlootable resources. This is not what the regression results imply. My hypothesis that lootable resources, represented by mineral exports (% of GDP), should give a higher risk of civil war onset, seems to not hold in the core model. However, Lujala et al. (2005) question De Soysa's (2002) use of a mineral measure from the World Bank, similar to my mineral measure. They write that De Soysa's (2002) mineral measure only consists of eight metals and minerals (bauxite, copper, iron, ore, lead, nickel, phosphate rock, tin, and zinc). The mineral measure I use consists mainly of the same metals and minerals. Lujala et al. (2005) further write that these minerals and metals can not be viewed as highly lootable. A possible explanation for why mineral exports (% of GDP) is not significantly linked to civil war onset in the core model, may be because the measure actually consists of resources which are not very lootable. In other words, the fact that mineral exports (% of GDP) is not significantly linked to civil war onset, may not necessarily mean that lootable resources are not significantly linked to civil war onset.

My other hypothesis is that lootable resources (represented by mineral exports (% of GDP)) should give separatist conflict, whereas nonlootable resources (represented by fuel exports (% of GDP)) should give government conflict. In addition I examine the impact of natural resources in different time periods as Ross (2012) does. I extend the core model by dividing the sample in two periods, and distinguish between separatist and government conflict. The regression results partially confirm my hypothesis. Mineral exports (% of GDP) is significantly linked to the onset of separatist conflict, but fuel exports (% of GDP) is not significantly linked to the onset of government conflict. Oil income per capita is significantly linked to both types of conflict. Ross (2003a) writes that the more nonlootable a resource is, the higher likelihood for a separatist conflict, and that the more lootable a resource is, the higher likelihood for a nonseparatist conflict. Ross's (2003a) arguments are contradictory to my hypothesis and my finding that mineral exports (% of GDP) is significantly linked to separatist conflict. I argue

that mineral exports (% of GDP) may give separatist conflict because it consists of lootable resources. The local group may not need help from the government in extracting the resource. They are able to manage the resource on their own, and therefore the lootable resource may contribute to incentives to separate from the country. Why should they share the rents from a locally situated resource when they are able to extract the resource all by themselves. Fuel exports (% of GDP), consisting mainly of nonlootable resources, should according to my hypothesis increase the risk of onset of government conflict. It is more difficult for the local group to extract a nonlootable resource without help from the government, than extracting a lootable resource. The group has to control the government to control the resource. The regression results are not in line with my hypothesis. Note however that oil income per capita is significantly linked to government conflict, partially confirming my hypothesis that nonlootable resources give government conflict.

In line with Ross's (2012) arguments, oil income per capita is only significantly linked to civil war onset in the post-Cold War era. Both fuel exports (% of GDP) and mineral exports (% of GDP) are not significantly linked to civil war onset in either two periods.

I run a robustness test where I add binary measurements of oil income per capita, fuel exports (% of GDP), and mineral exports (% of GDP). The binary measure of oil income is mostly in line with the results from the core model and the extended core model. The exception is that the binary measure of oil income is only significantly linked to government conflict, not separatist conflict. This confirms my hypothesis that nonlootable resources should only contribute to government conflict. The result may imply that the significance of oil income per capita for the onset of separatist conflict in the core model, may be driven by other factors. By exluding those countries that have a low level of oil income per capita, I exclude countries where a separatist conflict may not be driven by the greed for oil rents, because oil revenues are not that high in the given country. The binary measure of fuel exports (% of GDP) is not significantly linked to civil war onset in all periods, in the Cold War era, nor government conflict and separatist conflict. This is in line with the core model and the extended core model, but not in line with my hypothesis that nonlootable resources give government conflict. It is

significantly linked to the onset of civil war in the post-Cold War era, which is in line with Ross's (2012) arguments, but not in line with the results from the extended model.

The results from using the binary measure of mineral exports (% of GDP) do not confirm nor deny the results from the core model and the extended model. The binary measure of mineral exports (% of GDP) is significantly linked to the onset of civil war in the entire period, which is my hypothesis. The measure is also significantly linked to the onset of civil war in the Cold War era. It it not significant for civil war onset in the post-Cold War era, or for separatist conflict. It is however significantly linked to the onset of government conflict, conflicting with my hypothesis that lootable resources should give separatist conflict, not government conflict.

By excluding democratic countries at different threshold levels, I examine whether democracy plays a role in determining the onset of civil war. It seems reasonable to assume that the risk for onset of civil war is lower in democratic countries. Hegre et al. (2001) show that semi-democratic countries are more prone to civil wars. They find an inverted U-shaped relationship between democracy and civil war, and write that a fully autocratic country and a fully democratic country are equally unlikely to experience internal conflict. Semi-democratic countries are partly open, and partly repressive. This combination may invite to rebellion and civil violence. The repression creates grievance, while the openness allows for rebellion groups to organize themselves and riot againt the government (Hegre et al., 2001). In the core model, fuel exports (% of GDP) and mineral exports (% of GDP) are not significantly linked to the onset of civil war when I exclude the most democratic countries. It would be interesting to examine if the results change if I only include semi-democratic countries, in line with what Hegre et al. (2011) find. This is unfortunately beyond the scope of this thesis. The results in the extended core model change when I exclude democratic countries. Mineral exports (% of GDP) loses significance for separatist conflict. Fuel exports (% of GDP) becomes significant for government conflict, which is in line with my hypothesis, when I exclude countries with a democracy score higher than or equal to 9, and higher than or equal to 8, respectively. This may imply that fuel exports (% of GDP) only give government conflict in countries with a lower degree of democracy. I also find that fuel exports (% of GDP) is significantly linked to

separatist conflict when I exclude democratic countries, for almost all chosen threshold levels for excluding democratic countries. Maybe separatist conflict is more likely to occur in countries with a lower degree of democracy, due to grievances such as political repression of an ethnic group. Nevertheless, the implications from excluding democratic countries at different threshold levels are not straightforward. Ross (2012, p.147) writes that the effect of democracy is hard to sort out. Fearon & Laitin (2003) claim that the most relevant mechanism for the onset of civil war is per capita income level, which is negatively correlated with the onset of civil war. As long as the per capita income level is sufficiently low, a life as a rebel can be attractive to young men. Then it does not matter if the country is democratic. Fearon & Laitin (2003) find that civil war onsets are no less frequent in democracies after controlling for income in their regressions. This may indicate that it would be better to exclude high income countries rather than the most democratic countries, to examine if the results change.

Other scholars, including Ross (2012), only comment on the significance of the variables when using logit models. In this thesis I also comment on the marginal effects. However, the marginal effects do not clarify very much. For instance that a 1% increase in mineral exports (% of GDP) increases the probability of separatist conflict with 0.01%. A 0.01% increase in the probability of separatist conflict does not clarify how potentially harmful mineral exports (% of GDP) can be for separatist conflict. The marginal effect at the mean represents marginal effects when all explanatory variables are at their mean (Cameron & Trivedi, 2010, p.347). But all country-years observations are probably not at the mean values of the variables. Remember that marginal effects in the logit model are not constant. In linear models, marginal effects are. Nevertheless, it is interesting to get a new view on the link between natural resources and the onset of internal conflict.

When using Ross's (2012) natural log of oil income measure, oil income is positively linked to both separatist and government conflict. However, these results depend on how the origin of the variable is changed before log-transforming the variable. I hypothesize that nonlootable resources, oil and fuel, should only be significantly linked to government conflict, which is in line with the results from the regressions with a new measure of the natural log of oil income

per capita. When excluding countries with zero oil production and running the same regression, I also find that oil income is only significant for government conflict. This may indicate that adding an infinitesimal value instead of the value 1 to the original value of oil and gas production before log-transforming it, may be more appropriate. On the other hand, the significance of oil income on civil war onsets in the post-Cold War era does not depend on how the origin of the variable is changed before log-transforming the variable.

By examining the data set, I find that there are many missing values for fuel exports (% of GDP) and mineral exports (% of GDP). Due to missing observations, the results in the core model, the extended core model, and the robustness tests are perhaps misleading, compared to the results from Ross's (2012) regressions with oil income per capita as the main explanatory variable. In addition, the threshold levels I have chosen for defining binary measures in the robustness tests may not be appropriate. I choose a threshold of 5% for the binary measure of mineral exports (% of GDP), which is lower than the threshold of 20% for the binary measure of fuel exports (% of GDP). This may imply that a country classified as a mineral exporting country is not that reliant on mineral exports compared to how reliant a country classified as a fuel exporting country is on fuel exports, as discussed by Krüger (2013). Since the threshold level for defining mineral exporting countries is low, it may just be a coincidence that countries classified as mineral exporting countries have a higher likelihood for the onset of government conflict rather than separatist conflict. It may not be related to mineral exports after all, because how reliant a country is on mineral exports may not necessarily be explained by a 5% threshold. For example, a country that has a mineral exports share of 6% of GDP, is not necessarily reliant on mineral exports, and one can therefore not conclude that the given country experiences government conflict due to minerals. It is important to keep in mind that the chosen threshold levels and missing values may influence the regression results.

How to measure natural resource reliance have been heavily discussed by several scholars, as also mentioned in the literature review. Sachs & Warner (1995) popularized the use of primary exports as a fraction of GDP. Lujala et al. (2005) write that the mesure has a weakness because it does not distinguish between different types of resources. Brunnschweiler & Bulte

(2009) argue that the measure of primary exports as a fraction of GDP is not a good proxy for resource reliance. Resource rich countries may have developed other industries, not making them reliant on primary commodities. They worry that the common resource variable may be endogenous with respect to civil war. Therefore they add a proxy for resource abundance. The proxy is a stock variable that captures the discounted value of future flow of resource rents. They use this to test whether resource abundance affects conflict directly, or indirectly via income and resource reliance. Humphreys (2005) is also sceptical towards using primary commodity exports as a fraction of GDP, because this measure includes reexports. Commodities that are shipped through the country are included in the measurement, giving a mistaken impression that the country produce more of the commodity than it actually does.[22] Instead, Humphreys (2005) uses oil production as a measurement of oil resources.

De Soysa (2002) questions the use of primary commodity exports share of total exports as a proxy for greed. He criticizes the use of the proxy to determine whether a country is resource abundant or resource scarce, and to draw conclusions about the link between natural resources and internal conflict. De Soysa (2002) argues that the use of the primary exports to total exports measure can be criticized based on the following four grounds: The link between reliance on primary commodity exports and conflict, can be explained by the fact that poor countries may be unable to supply the demands of the people, which then again leads to grievances followed by conflict. Poor countries are often reliant on primary commodity exports. Further, the ratio of primary commodity exports as a share of total exports will not only vary with the nominator (primary exports), but also with the denominator (total exports). This makes it troublesome to use the measure to determine whether a country is resource abundant or resource scarce. A country may have a large ratio of primary commodity exports as a share of total exports, but one has to take into consideration that total exports may not be very large. This makes the country look more resource abundant than it actually is. In addition, underlying factors may influence which goods are being traded, also making it complicated to use the ratio as a proxy for greed. Last, a large share of oil exporting countries are Islamic countries. It may be features

[22] I give examples of this in the data section of my thesis.

of Islam's militarism that drives the conflict, instead of natural resources. Note that De Soysa (2002) criticizes the use of primary commodity exports share of total exports, not share of GDP, the measure I use. Nevertheless, his arguments against using exports share of total exports as a proxy for greed, could just as well have been arguments against using exports share of GDP to proxy for greed. De Soysa (2002) finds that the relative availability of natural resources is unrelated to conflict. However, mineral wealth is significant for predicting the onset of conflict. He argues that this is because minerals can give high payoff and are easy to capture. When introducing a dummy variable for oil exporting countries, De Soysa (2002) finds that it is more likely for an oil exporting country to experience conflict rather than a nonoil exporting country. It seems like it is the proxy for greed which is problematic, not necessarily the view that natural resources are linked to conflict.

However, several researchers have used exports as a fraction of GDP, such as Collier & Hoeffler (2004). They argue that many characteristics are correlated with per capita income, which makes the per capita income measure open to other interpretations. Collier & Hoeffler (2004) find that primary commodity exports are highly significant for the start of civil war. The risk of conflict peaks when the primary commodity exports constitute one third of GDP, in other words, a high level of reliance. Beyond this point, revenues from the exported commodity available to the state is said to be large enough so that civil war is less likely (Collier & Hoeffler, 2004).

Basedau & Lay (2009) point out that almost all studies before 2009 use resource exports as a fraction of GDP to proxy resource wealth. Since resource wealth per capita is indirectly measured by GDP per capita, the effect of resource wealth income per capita is confusing. Basedau & Lay (2009) use both oil production per capita and oil exports as a fraction of GDP as explanatory variables in their regression analyses. They examine how the effect of the explanatory variables may differ, and conclude that it is reliance rather than wealth that creates problems. Oil exporting countries are often more prone to internal conflict, whereas countries that are oil rich in per capita terms tend to avoid internal conflict. Note that this is the opposite of what I find, that fuel exports (% of GDP) is not significantly linked to civil war onset,

whereas oil income per capita is significantly linked to civil war onset. Maybe the regression results would be different if I used a narrower exports measure, for instance oil exports (% of GDP) instead of fuel exports (% of GDP). Basedau & Lay (2009) underline the importance of distinguishing between reliance on resources and resource wealth, as it seems like they work in different directions regarding conflict and peace, which is in line with the regression results from the core model.

Le Billon (2001) writes that one cannot reduce internal conflicts to greed driven resource conflicts. In the literature review I write that necessary factors for the onset of civil war are motivation, opportunity, and identity (Lujala et al., 2005). In the regression analysis I mainly focuse on economic motivation as a factor for the onset of civil war. A possible extention would be to control for ethnicity and religion, to examine how these factors influence the risk for onset of civil war. If a group situated in a resource abundant area view themselves as different from the rest of the country due to for instance ethnicity and religion, this may give incentives to separate from the region. It may be religion and ethnicity that contribute to the onset of a separatist conflict, not necessarily greed for the resource. (Ross, 2012, p.183) controls for this, and finds that oil income is still significantly linked to the onset of civil war when control variables are added to the regression. It would be interesting to examine whether the same holds for fuel exports (% of GDP), and mineral exports (% of GDP). One of Ross's (2003a) hypothesis claims that uneven distribution of resource revenues gives grievance which can be a motive for conflict. However, Collier & Hoeffler (2004) find that greed is the best explanation for conflict, not grievance. Collier (2000) writes that grievances such as inequality, political repression, and ethnic and religious fractionalization have no explanatory power in predicting the onset of internal conflict. Even though they may generate political conflict, such conflict usually does not develop into a violent conflict (Collier, 2000).

Another possible extension of the thesis would be to construct per capita measures for fuel exports and mineral exports. This may provide different results from the results of mineral exports (% of GDP) and fuel exports (% of GDP). It would be especially interesting to examine if a per capita measure of fuel exports coincides with the per capita measure of oil income, since

both measures consist of nonlootable resources. Unfortunately, the time limit has prevented me from doing this.

7 Conclusion

I have examined how different types of natural resources affect the likelihood for the onset of civil war by introducing two new measurements of natural resources, fuel exports (% of GDP) and mineral exports (% of GDP) in addition to Ross's (2012) oil income per capita measure. I have also examined how different types of resources may give different types of civil war, respectively separatist and government conflict.

Reliance on natural resources may be harmful to a country. How harmful it is, depends on the resource type. Ross's (2012) results from the core model show that oil income per capita is significantly linked to the onset of civil war, whereas I find that fuel exports (% of GDP) and mineral exports (% of GDP) are not significantly linked to the onset of civil war. Oil is a nonlootable resource, and fuel exports (% of GDP) consists mainly of nonlootable resources, and should therefore give the same results in the regression analysis. According to my hypothesis, mineral exports (% of GDP) should give the highest likelihood for the onset of civil war, which is conflicting with the regression results from the core model.

When I extend the core model and distinguish between separatist conflict and government conflict, lootable resources (represented by the mineral measure) are significant for separatist conflict, whereas fuel exports (% of GDP) is not significantly linked to either two types of conflict. Oil income per capita is significantly linked to both types of conflict. Again, fuel exports (% of GDP) and oil income per capita should give the same results, both being or consisting of nonlootable resources. Dividing the sample into two periods, the Cold War era, and the post-Cold War era, gives the following results: oil income per capita is only linked to the onset of civil war in the post-Cold War era, whereas fuel exports (% of GDP) and mineral exports (% of GDP) are not linked to civil war onsets in either periods.

By using a binary measure of oil income, fuel exports (% of GDP), and mineral exports (%

of GDP), I only include countries that can be classified as oil producers, fuel exporters, and mineral exporters, respectively. The binary measure of oil income is mostly in line with the core model and the extended version. The only difference is that the binary measure is not significantly linked to separatist conflict. The binary measure of fuel exports (% of GDP) is also mostly in line with the core model and the extended version. The only change for fuel exports (% of GDP) is that the binary measure is significantly linked to the onset of civil war in the post-Cold War era. The results from using the binary measure of mineral exports (% of GDP) are not in line with the results from the core model and the extended model. The binary measure of mineral exports (% of GDP) is significantly linked to the onset of civil war in all states and periods, in line with my hypothesis. It is also significantly linked to onset of civil war in the Cold War era. Unlike the regression results from the extended model and my hypothesis, the binary measure of mineral exports (% of GDP) is significantly linked to government conflict instead of separatist conflict.

There are many different approaches to measure resource wealth. I discuss positive and negative sides of the different types of measurements, based on what other scholars write. It is important to bear in mind that the results may be influenced by which measure one chooses to use. The results may also be influenced by missing values in the data set.[23]

How you alter the natural log of oil income may also influence the regression results. Ross (2012) finds that oil income is significantly linked to the onset of both separatist conflict and government conflict. By altering the value added to the original value of oil income per capita (before taking the natural log), I have examined whether the p-values of oil income per capita for the onset of government conflict change. This shows that Ross's (2012) results are sensitive to how the origin of the variable is changed before log-transforming it.

[23]See section A.1 and section A.2 in the appendix for overview of year observations for each country included in the regressions in the core model.

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A Appendix

Dofile is available upon request.

”Fuel” corresponds to SITC section 3 (mineral fuels). ”Minerals” corresponds to the commodities in SITC section 27 (crude fertilizer, minerals), section 28 (metalliferous ores, scrap) and section 68 (nonferrous metals). (United Nations Statistics Division, 2013).

Table A.1: Definition of variables used in the regression analyses.

Variable	Definition
id	3 letter country code
year	Time period (year in the estimation period)
population	Log population, lagged by one year
logincome	Log income per capita, lagged by one year
oilincome	Log of oil income per capita, lagged by one year
bettermeasure	Subtract 1 from Ross's original value of oil and gas production per capita, and add an infinitesimal number
logbettermeasure	The natural log of bettermeasure
oilincomebinary	Countries generating at least a hundred dollars per capita in oil income (constant 2000 dollars), lagged by one year
laggedfuel	Fuel exports (% of GDP), lagged by one year
laggedfuelbinary	Countries with at least 20% fuel exports (% of GDP), lagged by one year
laggedmineral	Mineral exports (% of GDP), lagged by one year
laggedmineralbinary	Countries with at least 5% mineral exports (% of GDP), lagged by one year
domesticconflict	Dummy for onset of civil war, no conflict 2 prior years
separatistconflict	Dummy for onset of separatist conflict, no conflict 2 prior years
governmentconflict	Dummy for onset of government conflict, no conflict 2 prior years
peaceyears	Time since last domestic conflict onset
splineone	Peaceyears-k1 cubed
splinetwo	Peaceyears-k2 cubed
splinethree	Peaceyears-k3 cubed
fuelexpshare	Fuel exports (% of merchandise exports)
minexpshar	Mineral exports (% of merchandise exports)
merchexp	Merchandise exports (current US$)
populationwb	Total population from WB

A.1 Countries Included in the Core Model. Fuel exports (% of GDP).

Latin America and Caribbean

Country	#Years
Argentina	44
Bahamas	15
Barbados	37
Belize	19
Bolivia	44
Brazil	43
Chile	44
Colombia	44
Costa Rica	41
Cuba	2
Dominican Republic	24
Ecuador	42
El Salvador	43
Guatemala	41
Guyana	20
Haiti	2
Honduras	40
Jamaica	34
Mexico	44
Nicaragua	38
Panama	44
Paraguay	26
Peru	43
Suriname	16
Trinidad and Tobago	38
Uruguay	35
Venezuela	44

East Asia and Pacific

Country	#Years
Australia	43
Brunei Darussalam	27
Cambodia	13
China	22
Fiji	34
Indonesia	39
Japan	44
Korea, Rep.	44
New Zealand	41
Malaysia	42
Papa New Guinea	25
Philippines	44
Singapore	44
Solomon Islands	18
Thailand	43
Vietnam	9

North America

Country	#Years
Canada	44
United States	44

Europe and Central Asia

Country	#Years
Albania	10
Armenia	8
Austria	43
Azerbaijan	10
Belarus	8
Belgium	43
Bosnia and Herzegovina	3
Bulgaria	10
Croatia	14
Czech Republic	13
Cyprus	31
Denmark	44
Estonia	11
Finland	43
Georgia	10
Germany	36
France	44
Greece	44
Hungary	37
Iceland	18
Ireland	43
Italy	44
Kazakhstan	11
Kyrgyz Republic	10
Latvia	12
Lithuania	12
Luxembourg	7
Macedonia	12
Malta	35
Moldova	10
Mongolia	10
Netherlands	44
Norway	42
Poland	19
Portugal	44
Romania	17
Russia	10
Slovak Republic	12
Slovenia	13
Spain	44
Sweden	44
Switzerland	44
Tajikistan	1
Turkey	44
Turkmenistan	4
Ukraine	10
United Kingdom	44

Sub-Saharan Africa

Country	#Years
Angola	2
Benin	29
Botswana	6
Burkina Faso	32
Burundi	5
Cameroon	33
Cape Verde	8
Central African Republic	26
Chad	14
Comoros	2
Congo, Dem. Rep.	10
Congo, Rep.	25
Cote d'Ivoire	33
Ethiopia	7
Gabon	31
Gambia	20
Ghana	32
Guinea	10
Guinea-Bissau	4
Kenya	29
Lesotho	4
Liberia	16
Madagascar	40
Malawi	37
Mali	19
Mauritania	12
Mauritius	19
Mozambique	11
Namibia	6
Niger	30
Nigeria	33
Rwanda	8
Senegal	37
Sierra Leone	7
South Africa	25
Sudan	31
Swaziland	6
Tanzania	9
Togo	38
Uganda	13
Zambia	24
Zimbabwe	18

North Africa and Middle East

Country	#Years
Afghanistan	10
Algeria	38
Bahrain	23
Djibouti	5
Egypt	41
Eritrea	2
Iran	22
Iraq	9
Israel	42
Jordan	29
Kuwait	34
Lebanon	9
Libya	3
Morocco	44
Oman	27
Qatar	22
Saudi Arabia	19
Syria	28
Tunisia	44
Yemen	12
United Arab Emirates	11

South Asia

Country	#Years
Bangladesh	27
Bhutan	7
India	44
Maldives	2
Nepal	5
Pakistan	43
Sri Lanka	39

A.2 Countries Included in the Core Model. Mineral exports (% of GDP).

Latin America and Caribbean

Country	#Years
Argentina	44
Bahamas	22
Barbados	37
Belize	22
Bolivia	44
Brazil	44
Chile	44
Colombia	44
Costa Rica	41
Cuba	8
Dominican Republic	28
Ecuador	44
El Salvador	43
Guatemala	41
Guyana	20
Haiti	6
Honduras	43
Jamaica	34
Mexico	44
Nicaragua	40
Panama	44
Paraguay	38
Peru	43
Suriname	17
Trinidad and Tobago	38
Uruguay	35
Venezuela	44

East Asia and Pacific

Country	#Years
Australia	43
Brunei Darussalam	26
Cambodia	14
China	22
Fiji	34
Indonesia	39
Japan	44
Korea, Rep.	44
New Zealand	41
Malaysia	42
Papa New Guinea	25
Philippines	44
Singapore	44
Solomon Islands	12
Thailand	43
Vietnam	9

North America

Country	#Years
Canada	44
United States	44

Europe and Central Asia

Country	#Years
Albania	10
Armenia	8
Austria	43
Azerbaijan	10
Belarus	8
Belgium	44
Bosnia and Herzegovina	3
Bulgaria	10
Croatia	14
Czech Republic	13
Cyprus	31
Denmark	44
Estonia	11
Finland	43
Georgia	10
Germany	36
France	44
Greece	44
Hungary	42
Iceland	44
Ireland	43
Italy	44
Kazakhstan	11
Kyrgyz Republic	10
Latvia	12
Lithuania	12
Luxembourg	7
Macedonia	12
Malta	35
Moldova	12
Mongolia	10
Netherlands	44
Norway	42
Poland	19
Portugal	44
Romania	17
Russia	10
Slovak Republic	12
Slovenia	13
Spain	44
Sweden	44
Switzerland	34
Tajikistan	1
Turkey	44
Turkmenistan	4
Ukraine	10
United Kingdom	44

Sub-Saharan Africa

Country	#Years
Angola	2
Benin	30
Botswana	6
Burkina Faso	33
Burundi	17
Cameroon	33
Cape Verde	11
Central African Republic	27
Chad	14
Comoros	8
Congo, Dem. Rep.	10
Congo, Rep.	25
Cote d'Ivoire	33
Ethiopia	11
Gabon	31
Gambia	14
Ghana	32
Guinea	11
Guinea-Bissau	7
Kenya	29
Lesotho	5
Liberia	17
Madagascar	40
Malawi	37
Mali	27
Mauritania	18
Mauritius	21
Mozambique	11
Namibia	6
Niger	30
Nigeria	33
Rwanda	9
Senegal	37
Sierra Leone	11
South Africa	25
Sudan	35
Swaziland	6
Tanzania	9
Togo	38
Uganda	13
Zambia	24
Zimbabwe	17

North Africa and Middle East

Country	#Years
Afghanistan	5
Algeria	38
Bahrain	23
Djibouti	5
Egypt	41
Eritrea	3
Iran	22
Iraq	9
Israel	44
Jordan	30
Kuwait	34
Lebanon	9
Libya	2
Morocco	44
Oman	27
Qatar	20
Saudi Arabia	29
Syria	28
Tunisia	44
Yemen	12
United Arab Emirates	11

South Asia

Country	#Years
Bangladesh	20
Bhutan	7
India	44
Maldives	11
Nepal	22
Pakistan	43
Sri Lanka	39